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高月 亨

Takatsuki Toru

Abstract

(57) 要約

(57) [Abstract]

目的

[Objective]

ArF 極超短波長光 発振波長領域 透明 感光材(光酸発生剤等) 導入 感光基 選択等 設計 長波長 感度(吸収) 構成 g 線, i 線, KrF 使用可能 微細加工 好適 汎用性 富 感光性樹脂組成物 提供

As in ArF excimer laser or other ultrashort wave Osamitsu excitation wavelength domain with transparent, from had sensitivity (Absorption) in long wavelength at same time photosensitive material (photo acid generator etc) and with selection or other design of photosensitive group which is introduced, configuration doing, even in g-line, i-line, KrF excimer laser etc it made usable, being ideal in microfabrication, it offers photosensitive resin composition which is rich to commodity.

構成

[Constitution]

1 樹脂 骨格 架橋 構造 有 樹脂 光酸発生剤 含有

1 cellulose resin, contains base resin and photo acid generator which possess crosslinked structure with acetal or ketal skeleton.

2 樹脂

2 cellulose resin, have crosslinked structure with acetal or

・骨格・架橋・構造・有・該架橋部位
・光酸発生機能・備・

3 ・樹脂
・骨格・架橋・該架橋部位以外・部分・
光酸発生機能・備・基・導入・

Claims

特許請求・範囲・

請求項 1 ・

・樹脂
・骨格・架橋・構造・有・樹脂
・光酸発生剤・少・含有・感光性樹脂組成物・

請求項 2 ・

・樹脂
・骨格・架橋・構造・有・該架橋部位
・光酸発生機能・備・特徴・感光性樹脂組成物・

請求項 3 ・

架橋部位・与・成分・化合物・有機・基・有機・基・有・光・酸・発生・機能・付与・特徴・請求項 2
・記載・感光性樹脂組成物・

請求項 4 ・

・樹脂
骨格・架橋・構造・樹脂・該架橋部位以外・部分・光酸発生機能・備・基・導入・特徴・感光性樹脂組成物・

請求項 5 ・

光酸発生機能・備・基・樹脂・残留水酸基・有機・化物・酸・酸・結合・導入・特徴・請求項 4
・記載・感光性樹脂組成物・

請求項 6 ・

下記(a)~(c)・(a)~(c)・任意・2成分・混合物・特徴・感光性樹脂組成物・

(a) ・樹脂
・骨格・架橋・構造・有・樹脂・光酸発生剤・少・含有・感光性樹脂組成物・

ketal skeleton, said crosslink site has photoacid-generating function.

Those which introduce basis which 3 cellulose resin crosslinking it does with acetal or ketal skeleton, provides photoacid-generating function for portion other than said crosslink site.

[Claim(s)]

[Claim 1]

cellulose resin, photosensitive resin composition * which contains base resin and photo acid generator which possess crosslinked structure with acetal or ketal skeleton at least

[Claim 2]

cellulose resin, has crosslinked structure with acetal or ketal skeleton, photosensitive resin composition * to which said crosslink site has photoacid-generating function and makes feature

[Claim 3]

carbonyl compound which is a component giving crosslink site, has organic sulfone group or the organic halogen group, it is something which grants function where this generates acid with light and photosensitive resin composition * which is stated in Claim 2 which is made feature

[Claim 4]

cellulose resin with resin of crosslinked structure, it is something which introduces basis which provides photoacid-generating function for portion other than said crosslink site with acetal or ketal skeleton and photosensitive resin composition * which is made feature

[Claim 5]

photosensitive resin composition * which is stated in Claim 4 where basis which has photoacid-generating function, acid * or sulfonic acid which is a organic halide compound connects to the residual water acid radical of cellulose resin, is introduced by forming ester and makes feature

[Claim 6]

photosensitive resin composition * which description below (a) - everything of (c) or (a) - consists of mixture of 2 component of option among (c) and makes feature

(a) cellulose resin, photosensitive resin composition * which contains base resin and photo acid generator which possess crosslinked structure with acetal or ketal skeleton at least

(b) 樹脂 骨格 架橋 構造 有 該架橋部位 光酸発生機能 備 特徵 感光性樹脂組成物

(c) 樹脂 骨格 架橋 構造 樹脂 該架橋部位以外 部分 光酸発生機能 備 基 導入 特徵 感光性樹脂組成物

請求項 7

感光性樹脂組成物(b) 架橋部位 与 部分 化合物 有機 基 有機 基 有 光 酸 発生 機能 付与 特徵 請求項 6 記載 感光性樹脂組成物

請求項 8

感光性樹脂組成物(c) 光酸発生機能 備 基 樹脂 残留水酸基 有機 化合物 酸 酸 結合 導入 特徵 請求項 6 7 記載 感光性樹脂組成物

Specification

発明 詳細 説明

0001

産業上 利用分野

本発明 感光性樹脂組成物 関

本発明 例 電子材料(半導体装置等) 製造 各種 形成 技術 用 利用 得

0002

従来 技術

電子材料 製造 等 各種 形成 必要 場合 微細化 進行 例 半導体装置 分野 言 集積化 伴 微細化 進行 例 半導体集積回路 最小加工寸法 今 領域

微細 加工 可能 技術 KrF 技術 研究

(b) cellulose resin, has crosslinked structure with acetal or ketal skeleton, photosensitive resin composition to which the said crosslink site has photoacid-generating function and makes feature

(c) cellulose resin with resin of crosslinked structure, it is something which introduces basis which provides photoacid-generating function for portion other than said crosslink site with acetal or ketal skeleton and photosensitive resin composition which is made feature

[Claim 7]

carbonyl compound which is a portion giving crosslink site of photosensitive resin composition (b), has the organic sulfone group or organic halogen group, it is something which grants function where this generates acid with light and photosensitive resin composition which is stated in Claim 6 which is made feature

[Claim 8]

It is something which is introduced by fact that basis having photoacid-generating function of photosensitive resin composition (c), acid or sulfonic acid which is a organic halide compound connects to residual water acid radical of cellulose resin, forms ester and photosensitive resin composition which is stated in Claim 6 or 7 which is made feature

[Description of the Invention]

[0001]

[Field of Industrial Application]

this invention regards photosensitive resin composition.

As for this invention, it is something which it can utilize as photoresist which can be used for photolithography technology for various pattern formation in production process of the for example electronic material (semiconductor device etc).

[0002]

[Prior Art]

In production process etc of electronic material, when it is necessary to form various pattern, if narrowing of pattern is advancing and refers to field of for example semiconductor device, narrowing which accompanies integration advances more and more, as for minimum fabricated dimension of for example semiconductor integrated circuit, now is in sub quarter micron domain and has made wax.

Because of this, KrF excimer laser lithography technology etc is researched as technology whose microscopic processing is

.....更.....以降・技術.....
 EB 直接描画技術・ArF.....
技術・X 線.....技術.....注
 目.....

0003・

光.....技術.....言.....・ArF・
技術・有力.....
波長領域・有機物・紫外吸収領域・
領域.....用.....
 感光性組成物.....環.....
 問題・生・得・吸収・示.....原子団・含有
骨格.....望.....

0004・

.....波長領域・材料.....
 PMMA 系・樹脂材料・知.....
感光性樹脂組成物
 ・必.....満足・行.....
言.....以外.....目新.....
現状.....

0005・

.....技術・用・感光性樹脂組
 成物.....上記.....微細加工可能・
 ArF.....対.....好適・使用・
長波長・光(g 線・i 線・KrF
)・対.....使用可能・設
 計.....望.....

0006・

・発明・目的・

本発明・上記事情・鑑.....
 ArF.....極超短波長光・発
 振波長領域・透明・感光性樹脂組成物.....
設計.....例.....感光材(光酸発生剤
 等)・導入.....感光基・選択.....長波
 長・感度(吸収).....構成.....例.....g
 線,i 線,KrF.....使用可能
微細加工・好適.....汎用性・
 富.....感光性樹脂組成物・提供.....
目的.....

0007・

・目的・達成.....手段・

本出願・請求項 1・発明.....樹脂
骨格.....架
 橋.....構造・有.....樹脂・光酸発生剤

possible, EB drawing technology・ArFexcimer laser
 lithography technology・X-ray lithography technology etc is
 observed directly furthermore and technology as after that.

[0003]

If photolithography is said concerning technology,
 ArFexcimer laser lithography technology is powerful, but as
 for this wavelength domain in order to hit to domain which is
 made wax in ultraviolet absorption territory of organic matter,
 as photosensitive composition which is used for this, if
 possible shows problem absorption which such as benzene
 ring can cause, those of skeleton which does not contain kind
 of atom group which are desired.

[0004]

However, resin material of PMMA type is known as material
 of this wavelength domain,, but photosensitive resin
 composition which designates only this as base resin was
 not something which always it is satisfied.

With says, as for new ones fact that is present state other than
 that it is not.

[0005]

In addition, as photosensitive resin composition which is used
 for lithography technology, as description above as you can
 use for ideal vis-a-vis microfabricable ArFexcimer laser, you
 can design it is desired to usable from that vis-a-vis optical
 (g-line・i-line・KrF excimer laser etc) of long wavelength.

[0006]

[Objective]

As for this invention, considering to above-mentioned
 situation, being something which it is possible, as in
 ArFexcimer laser or other ultrashort wave Osamitsu
 excitation wavelength domain with transparent photosensitive
 resin composition, for example photosensitive material
 (photo acid generator etc) and with selection of photosensitive
 group which it introduces, from had sensitivity (Absorption) in
 long wavelength at same time with design, configuration
 doing, it is a usable even in for example g-line, i-line, KrF
 excimer laser etc, Being ideal in microfabrication, and it
 offers photosensitive resin composition which it tries to enrich
 to commodity it makes objective.

[0007]

{means in order to achieve objective }

As for invention of Claim 1 of this application, cellulose
 resin, with the photosensitive resin composition which
 contains base resin and photo acid generator which possess

・少・含有・感光性樹脂組成物・
 ・上記目的・達成・
 ・

本明細書中・樹脂・
 ・高分子鎖・主鎖・少・一部・含有・
 ・言・

0008・

本出願・請求項 2・發明・樹脂・
 ・骨格・架橋・
 ・構造・有・該架橋部位・光酸発生機能・
 ・備・特徵・感光性樹脂組成物・
 ・上記目的・達成・
 ・

0009・

本出願・請求項 3・發明・架橋部位・与・
 ・成分・化合物・有機・
 ・基・有機・基・有・光・
 ・酸・発生・機能・付与・
 ・特徵・請求項 2・記載・感光性樹脂組成物・
 ・上記目的・達成・
 ・

0010・

本出願・請求項 4・發明・樹脂・
 ・骨格・架橋・
 ・構造・樹脂・該架橋部位以外・部
 分・光酸発生機能・備・基・導入・
 ・特徵・感光性樹脂組成物・
 ・上記目的・達成・
 ・

0011・

本出願・請求項 5・發明・光酸発生機能・
 ・備・基・樹脂・残留水酸基・
 ・有機・化物・酸・
 ・酸・結合・導入・
 ・特徵・請求項 4・記載・感光性樹脂組成物・
 ・上記目的・達成・
 ・

0012・

本出願・請求項 6・發明・下記(a)~(c)・
 ・(a)~(c)・任意・2成分・混
 合物・特徵・感光性樹脂組成物・
 ・上記目的・達成・
 ・

(a)・樹脂・
 ・骨格・架橋・構造・有・樹脂・
 ・光酸発生剤・少・含有・感光性
 樹脂組成物

crosslinked structure with acetal or ketal skeleton at least, is something which because of this achieves above-mentioned objective.

In this specification, "cellulose resin" with, it means that it contains cellulose at least as portion of main chain of polymer chain.

[0008]

As for invention of Claim 2 of this application, cellulose resin, has the crosslinked structure with acetal or ketal skeleton, with photosensitive resin composition to which said crosslink site has photoacid-generating function and makes feature, it is something which because of this achieves above-mentioned objective.

[0009]

As for invention of Claim 3 of this application, carbonyl compound which is a component which gives crosslink site, has organic sulfone group or organic halogen group, it is something which grants function where this generates acid with light and with photosensitive resin composition which is stated in Claim 2 which is made feature, it is something which because of this achieves above-mentioned objective.

[0010]

Invention of Claim 4 of this application cellulose resin with resin of crosslinked structure, is something which introduces basis which provides photoacid-generating function for portion other than said crosslink site with acetal or ketal skeleton and with photosensitive resin composition which is made feature, it is something which because of this achieves above-mentioned objective.

[0011]

With photosensitive resin composition which is stated in Claim 4 where basis which has photoacid-generating function, acid or sulfonic acid which is an organic halide compound connects the invention of Claim 5 of this application, to residual water acid radical of cellulose resin, is introduced by forming ester and makes feature, it is something which because of this achieves the above-mentioned objective.

[0012]

With photosensitive resin composition where invention of Claim 6 of this application description below (a) - everything of (c) or (a) - consists of the mixture of 2 component of option among (c) and makes feature, it is something which because of this achieves above-mentioned objective.

(a) cellulose resin, photosensitive resin composition which contains base resin and photo acid generator which possess crosslinked structure with acetal or ketal skeleton at least

樹脂組成物・

(b) ・ ・ ・ ・ ・ 樹脂 ・ ・ ・ ・ ・
 ・ ・ 骨格 ・ ・ ・ 架橋 ・ ・ 構造 ・ 有 ・ 該架橋部
 位 ・ 光酸発生機能 ・ 備 ・ ・ ・ ・ 特徴 ・ ・ ・ 感
 光性樹脂組成物 ・

(c) ・ ・ ・ ・ ・ 樹脂 ・ ・ ・ ・ ・
 ・ 骨格 ・ ・ ・ 架橋 ・ ・ 構造 ・ 樹脂 ・ ・ ・ ・ 該
 架橋部位以外 ・ 部分 ・ 光酸発生機能 ・ 備 ・ ・
 基 ・ 導入 ・ ・ ・ ・ ・ 特徴 ・ ・ ・ 感光
 性樹脂組成物 ・

0013 ・

本出願 ・ 請求項 7 ・ 発明 ・ 感光性樹脂組成
 物(b) ・ 架橋部位 ・ 与 ・ ・ 部分 ・ ・ ・ ・ ・
 ・ 化合物 ・ 有機 ・ ・ ・ 基 ・ ・ ・ 有機 ・ ・
 ・ ・ 基 ・ 有 ・ ・ ・ ・ 光 ・ ・ ・ 酸 ・ 発生 ・ ・
 機能 ・ 付与 ・ ・ ・ ・ ・ 特徴 ・ ・ ・ 請
 求項 6 ・ 記載 ・ 感光性樹脂組成物 ・ ・ ・ ・
 ・ ・ ・ ・ 上記目的 ・ 達成 ・ ・ ・ ・ ・

0014 ・

本出願 ・ 請求項 8 ・ 発明 ・ 感光性樹脂組成
 物(c) ・ 光酸発生機能 ・ 備 ・ ・ 基 ・ ・ ・ ・
 ・ 樹脂 ・ 残留水酸基 ・ ・ 有機 ・ ・ ・ 化物 ・
 ・ ・ 酸 ・ ・ ・ ・ ・ 酸 ・ 結合 ・ ・ ・ ・
 ・ ・ ・ ・ ・ 導入 ・ ・ ・ ・ ・
 ・ ・ 特徴 ・ ・ ・ 請求項 6 ・ ・ ・ 7 ・ 記載 ・ 感光
 性樹脂組成物 ・ ・ ・ ・ ・ 上記目的 ・
 達成 ・ ・ ・ ・ ・

0015 ・

本発明 ・ 好 ・ ・ ・ 態様 ・ 一 ・ ・ ・ ・ 請求
 項 1 ・ 発明 ・ 適用 ・ ・ ・ ArF ・ ・ ・ ・ ・
 ・ ・ 極短波長光 ・ 発振波長領域 ・ 透明
 ・ ・ ・ ・ ・ 樹脂 ・ 骨格 ・ ・ ・ ・ ・
 ・ ・ ・ ・ ・ 化 ・ 行 ・ 分子間 ・ 架橋
 ・ 行 ・ ・ ・ ・ ・ 用 ・ 更 ・ ・
 ・ ・ 感光剤 ・ ・ ・ 光酸発生剤 ・ 加 ・ ・ 2 成分系
 ・ ・ ・ 感光性樹脂組成物 ・ 構成 ・ ・ ・

0016 ・

・ ・ ・ ・ ・ 樹脂 ・ ・ ・ ・ ・
 ・ ・ ・ 骨格 ・ ・ ・ 架橋 ・ ・ 構造 ・ 次 ・ ・
 ・ ・ 表 ・ ・ ・ ・ ・
 ・ ・ ・ ・ ・ 次式 ・ 示 ・ ・ ・ ・

化 1 ・

(b) cellulose resin, has crosslinked structure with acetal or ketal skeleton, photosensitive resin composition to which the said crosslink site has photoacid-generating function and makes feature

(c) cellulose resin with resin of crosslinked structure, it is something which introduces basis which provides photoacid-generating function for portion other than said crosslink site with acetal or ketal skeleton and photosensitive resin composition which is made feature

[0013]

As for invention of Claim 7 of this application, carbonyl compound which is a portion which gives crosslink site of photosensitive resin composition (b), has organic sulfone group or the organic halogen group, it is something which grants function where this generates acid with light and with photosensitive resin composition which is stated in Claim 6 which is made feature, it is something which because of this achieves above-mentioned objective.

[0014]

It is something which is introduced by fact that basis which has photoacid-generating function of photosensitive resin composition (c), acid or sulfonic acid which is a organic halide compound connects invention of Claim 8 of this application, to residual water acid radical of cellulose resin, forms ester and with photosensitive resin composition which is stated in Claim 6 or 7 which is made feature, it is something which because of this achieves above-mentioned objective.

[0015]

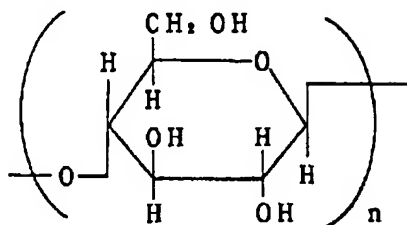
There being a one of embodiment where this invention is desirable, applying invention of Claim 1, even with ArF excimer laser or other ultrashort wave Osamitsu excitation wavelength domain it converts acetal or ketal in this with transparent cellulose resin as skeleton, it uses those which did crosslinking with intermolecular furthermore to this as the base resin, as photosensitizer configuration it does photosensitive resin composition as 2-component system including photo acid generator.

[0016]

namely, cellulose resin, following way displays crosslinked structure, with acetal or the ketal skeleton it is possible.

First, cellulose is shown with next formula.

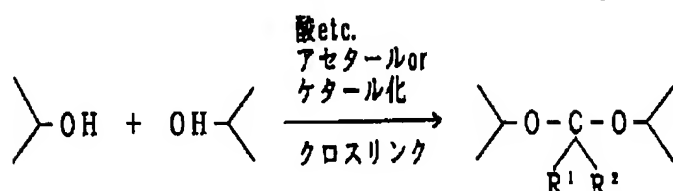
[Chemical Formula 1]



0017 •

OH 同士
骨格 架橋 次 表

北 2 ·



0018 -

但 $\cdot R^1, R^2 \cdot$ H, CH_3 等 $\cdot \cdot \cdot \cdot$ 基 $\cdot CH_2$
 $Cl, CHCl_2, CCl_3$ 等 置換 $\cdot \cdot \cdot \cdot$ 基 $\cdot \cdot \cdot \cdot$

0019 -

・ ・ ・ 架橋部位 ・ 酸 ・ ・ ・ ・ ・ 部位 ・ ・ ・ ・ 酸
・ 存在 ・ ・ ・ 上記式 ・ 右 ・ ・ 左 ・ ・ 反応 ・ 進
・ ・

・ ・ ・ ・ 光酸発生剤 ・ 同時 ・ 含有 ・ ・ ・ ・ ・ ・
 ・ ・ ・ ・ 光酸発生剤 ・ 酸 ・ ・ ・ ・ ・ 架橋 ・
 切 ・ 水溶性化 ・ ・ ・ ・ 低分子量化 ・ ・ ・

水・極性溶媒・・・現像液・・低極性溶媒・・
 ・・液・・・組　合・・・・・型・
 像・与・・・

0020 •

・ ・ 場 合 ・ 用 ・ ・ ・ ・ ・ ・ 光 酸 発 生 剤 ・ ・
 ・ ・ ・ ・ ・ ・ 塩 ・ 有 機 ・ ・ ・ ・ ・ ・ 化 物 ・ ・ ・ ・ ・
 ・ 酸 ・ ・ ・ ・ ・ ・ 類 ・ ・ ・ ・ ・ ・ 基 ・ ・ ・ ・ ・ ・

0021 •

架橋部位 光酸発生剤
構成 本発明・他・好 態様 .
・ (請求項 2 ・ 発明 ・ 適用) ・

・ ・ 場合 ・ ・ ・ ・ ・

[0017]

OH of this cellulose, following way displays, fact that the crosslinking it does, with acetal or ketal skeleton it is possible .

[Chemical Formula 2]

[0018]

However, R¹, R² is H, CH₃ or other alkyl group •CH₂Cl, CHCl₂, CCl₃ or other substituted alkyl group etc.

[0019]

As for this crosslink site with site which comes off with acid, reaction to left advances from right of above Formula with the existence of acid.

Depending, when this photo acid generator brings acid, by containing photo acid generator simultaneously crosslinking is cut off, water solubility conversion, is to be the molecular weight reduction it does.

Image of positive type is given due to especially combining water and polar solvent or other developer and rinse liquid etc of low polarity solvent.

[0020]

In this case onium salt ▪ organic halide compound ▪ sulfonic acid Oertel etc can be listed as photo acid generator which can be used.

[0021]

As crosslink site itself, been a photo acid generator, what configuration is done is embodiment whose other than this invention are desirable, (Application of invention of Claim 2).

In this case, it can make configuration which uses halogen

架橋剤
橋部位・光酸発生機能・有
発生・酸・酸・用・構
成

0022 •

・ ・ ・ 分子内 ・ 光酸発生剤 ・ 含有 ・ ・ ・ 態様 ・
本発明 ・ 好 ・ ・ ・ 実施態様 ・ ・ ・ (請求項 4 ・
発明 ・ 適用) ・

態樣 用 一 架橋
殘留水酸基 化
可能 含有 構成

```

      . . . . 化合物 . . . . . 酞酸 .
      . 有機 . . . 化物 . . . . 酞酸類 .
      . . . . . 酸 .
酞酸 . . . 例示 . . . .

```

・ ・ ・ ・ 場合 ・ ・ ・ ・ 化 ・ ・ ・ ・ ・
 ・ ・ ・ 塩基性条件化 ・ 行 ・ 必要 ・ ・ ・

架橋切

0023 •

· 实施例 ·

以下本發明・・實施例・・・・詳細・說明・

但・当然・ 本発明・以下・実
施例・ . . 限定・受・

0024 •

实施例 1

本実施例・・・請求項1・・・発明・・・2成分系(・・・樹脂・光酸発生剤・・・2成分・必須成分・・・含・・・)・・・感光性樹脂組成物・作製・・・

0025 ▪

1 樹脂・調製

DMF()及
水·混合溶媒·溶解·酸性條件下·發生·
分子間架橋·食
鹽水·投入後·抽出·硫酸·
·乾燥·後·濾過·
·濃縮·再沈澱·架
橋·得·

0026 •

・ ・ ・ ・ ・ 及 ・ 水 ・ 混合溶媒 ・ 溶解 ・ ・
請求項 1 ・ 發明 ・ ・ ・ ・ 感光性樹脂組成物 ・ ・

acid which occurs from here that crosslink site has photoacid-generating function with this, as acid it designates chloro acetaldehyde ▪ dichloro aceto al ▪ human etc as crosslinking agent.

[0022]

In addition, it is a embodiment where embodiment which contains photo acid generator in intramolecular this invention is desirable, (Application of invention of Claim 4).

In order to use this embodiment, configuration which contains residual water acidradical and esterification possible ones of this base resin which crosslinking is doneonce is taken, it is possible .

As this kind of compound, trichloroacetic acid or other organic halide compound and sulfone acetic acid etc and, trichloro methane sulfonic acid * methane sulfonic acid etc can be illustrated.

Furthermore esterification in this case has necessity to do with the triethylamine or other basic conditioning.

Because so unless it does, crosslinking is cut off.

[0023]

[Working Example(s)]

You explain in detail below this invention, with Working Example.

However is obvious thing, but this invention is not something which receives limitation with Working Example below.

[0024]

Working Example 1

With this working example, 2-component system photosensitive resin composition of (Those which include 2 component of base resin and photo acid generator as essential ingredient.) of type of invention of Claim 1 was produced.

[0025]

Manufacturing 1 resin

DMF (dimethyl formamide) and it melts cellulose in mixed solvent of water, under acidic condition, intermolecular crosslink it does with formaldehyde which occurs due to the cracking of paraformaldehyde after throwing ether extraction does in saline and after drying with magnesium sulfate, it filters, concentrates with rotary evaporator, by fact that reprecipitation it does, it obtains crosslinking cellulose in ethanol.

[0026]

This, it melts in mixed solvent of ethanol and water, in order to make photosensitive resin composition of invention type of

..... 光酸發生劑
 酞酸 加

..... 後濾過

..... 得 感光性樹脂組成物
 濾過後 狀態 使用
 塗布液 用

0027

実施例 2

本実施例 請求項 2 發明 1 成分系(..... 樹脂 架橋部位 光酸發生機能 有) 感光性樹脂組成物 作製

0028

1 樹脂 調製

..... DMF 及 水 混合溶媒 溶解
 酸性条件下 分子間
 化劑 用 分子間架橋
 食塩水 投入後 抽出 硫酸
 乾燥 後 濾過
 濃縮 再沈澱
 架橋 得

0029

..... 及 水 混合溶媒 溶解
 請求項 2 發明 感光性樹脂組成物 得

0030

実施例 3

本実施例 請求項 4 發明 1 成分系(..... 樹脂 架橋部位 以外 部分 光酸發生機能 備 基 導入) 感光性樹脂組成物 作製

0031

即 感光性樹脂組成物得
 實施例 1 得 架橋 樹脂
 DMF 溶解
 酞酸塩化物 加 殘留水酸基 一部
 酞酸

..... 及 水 混合溶媒 溶解
 請求項 4 發明 感光性樹脂組成物 得

0032

Claim 1, here it adds the trichloroacetic acid ester of ethylene glycol as photo acid generator.

After that it filters.

With state after this filtering, you can use photosensitive resin composition which itacquires in this way, as coating solution which is used for photolithography.

[0027]

Working Example 2

With this working example, photosensitive resin composition of single component system (Those where crosslink site of cellulose resin has photoacid-generating function.) of type of invention of Claim 2 was produced.

[0028]

Manufacturing 1 resin

Melting cellulose in mixed solvent of DMF and water, under the acidic condition, chloro acetaldehyde using for intermolecular acetalization agent, intermolecular crosslink doing, after throwing ether extraction it does in saline and after drying with magnesium sulfate, itfilters, concentrates with rotary evaporator, by fact that reprecipitation itdoes, it obtains crosslinking cellulose in ethanol.

[0029]

This, it melted in mixed solvent of ethanol and water, acquired the photosensitive resin composition of type of invention of Claim 2.

[0030]

Working Example 3

With this working example, photosensitive resin composition of single component system (Those which introduce basis where crosslink site of cellulose resin provides photoacid-generating function for portion other than.) of type of invention of Claim 4 was produced.

[0031]

Namely, in order photosensitive resin composition of this type to obtain, crosslinking cellulose resin which isacquired with Working Example 1 was melted in DMF, in this portion of residual water acid radical was designated as trichloroacetic acid ester including triethylamine and trichloroacetic acid chloride.

This, it melted in mixed solvent of ethanol and water, acquired the photosensitive resin composition of type of invention of Claim 4.

[0032]

実施例 4

・ ・ 実施例 ・ ・ ・ 上記実施例 1~3 ・ 得 ・ 感光性樹脂組成物 ・ 用 ・ ・ ・ ・ ・ 半導体 ・ ・ ・ 上 ・ ・ ・ ・ 形成 ・ 行 ・ ・ ・ ・

即 ・ ・ 実施例 1~3 ・ 係 ・ 3 種 ・ 樹脂 ・ ・ 各 ・ 5 ・ ・ ・ ・ ・ 回転塗布 ・ ・ 0.8 μ m ・ 膜厚 ・ ・ ・ ・ ・

・ ・ ・ 試作 ArF 露光機(密着型) ・ 用 ・ ・ 露光 ・ ・ 後 ・ 現像 ・ ・ ・ ・ 行 ・ ・ 乾燥 ・ ・ ・

各組成物 ・ 対 ・ ・ 用 ・ ・ 現像液 ・ ・ ・ ・ 液 ・ 及 ・ ・ ・ ・ 解像度 ・ 下 ・ 表 1 ・ 示 ・ ・

表 1 ・

使用液及 ・ ・ ・ ・ 解像度測定結果

感光性組成物	現像液	リンス液	パターン
実施例 1 の組成物	水+エタノール 1 : 1	キシレン	0.3 μ m ラインアンドスペース
実施例 2 の組成物	水+エタノール 1 : 2	キシレン	0.25 μ m ラインアンドスペース
実施例 3 の組成物	水+エタノール 1 : 4	キシレン	0.28 μ m ラインアンドスペース

0033 ・

以上 ・ ・ ・ ・ ・ 本実施例 ・ ・ ・ ・ ・
ArF ・ ・ ・ ・ ・ 発振波長領域 ・ 透明 ・
感光性樹脂組成物 ・ 得 ・ ・ ・ ・ ・ 良好 ・ ・
・ ・ ・ 形成 ・ 行 ・ ・ ・ ・ ・

0034 ・

実施例 5

上記実施例 1 ・ 架橋 ・ ・ ・ ・ ・ 樹脂 ・ ・ ・ ・ ・
・ ・ 長波長 ・ 感度(吸収) ・ ・ ・ ・ ・ 光酸発生剤 ・ 含有 ・ ・ ・ ・ ・ 光酸発生剤 ・
対応 ・ ・ 感光領域 ・ 従 ・ ・ g 線, i 線, KrF ・ ・ ・
・ ・ ・ ・ ・ 各 ・ 使用可能 ・ ・ ・ 感光性樹脂組成物 ・ 得 ・ ・ ・ ・ ・

0035 ・

Working Example 4

With this Working Example, pattern formation was done on silicon semiconductor wafer making use of the photosensitive resin composition which is acquired with above-mentioned Working Example 1~3.

Namely, spin coating it did resin of 3 kinds which relate to the Working Example 1~3, in each 5 inch wafer, tried to become film thickness of 0.8 μ m.

This, after exposing making use of trial manufacture ArF exposure apparatus (bonded), it did development *rinse, dried.

developer * rinse liquid * and pattern resolution which are used vis-a-vis each composition are shown in Table 1 under.

[Table 1]

used liquid and pattern resolution measurement result

[0033]

By fact that it makes like above, according to this working example, obtaining transparent photosensitive resin composition in excitation wavelength domain of ArF excimer laser, it does the satisfactory pattern formation because of this, it was possible.

[0034]

Working Example 5

Concerning crosslinking cellulose resin of above-mentioned Working Example 1, from, photosensitive resin composition which is each usable in g-line, i-line, KrF excimer laser in accordance with exposure to light domain to which photo acid generator corresponds, could be acquired in with fact that photo acid generator which has sensitivity (Absorption) in long wavelength is contained.

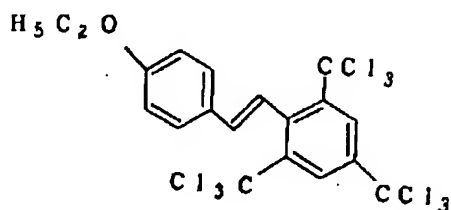
[0035]

本実施例・・・感光性樹脂組成物中・・・光酸発生剤・・・g線用及・・・i線用組成物・・・下記化合物1・・・用・・・KrF・・・用組成物・・・下記化合物2及・・・3・・・用・・・

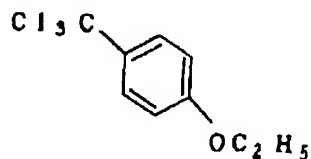
0036

化合物

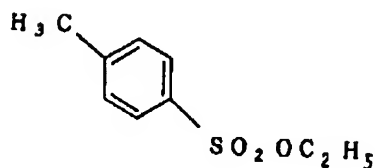
①



②



③



0037

実施例6

本実施例・・・下記感光性樹脂組成物(a)~(c)・・・混合・・・感光性樹脂組成物・・・用・・・

(a)・・・樹脂・・・
・・・骨格・・・架橋・・・構造・・・有・・・樹
脂・・・光酸発生剤・・・少・・・含有・・・感光性
樹脂組成物・・・実施例1・・・感光性組成物・・・

(b)・・・樹脂・・・
・・・骨格・・・架橋・・・構造・・・有・・・該架橋部
位・・・光酸発生機能・・・備・・・特徴・・・感
光性樹脂組成物・・・実施例2・・・感光性組
成物・・・

(c)・・・樹脂・・・
・・・骨格・・・架橋・・・構造・・・樹脂・・・該
架橋部位以外・・・部分・・・光酸発生機能・・・備・・・
基・・・導入・・・特徴・・・感光
性樹脂組成物・・・実施例3・・・感光性組成
物・・・

For g-line and making use of below-mentioned compound 1, the below-mentioned compound 2 and/or 3 was used to composition for KrF excimer laser in composition for i-line with this working example, as photo acid generator in photosensitive resin composition.

[0036]

[Chemical Formula 3]

[0037]

Working Example 6

With this working example, below-mentioned photosensitive resin composition (a) - mixing (c), it is used as photosensitive resin composition.

(a) cellulose resin, is photosensitive resin composition which contains base resin and photo acid generator which possess crosslinked structure with acetal or ketal skeleton at least, photosensitive composition of the Working Example 1

(b) cellulose resin, has crosslinked structure with acetal or ketal skeleton, it is a photosensitive resin composition to which the said crosslink site has photoacid-generating function and makes feature, photosensitive composition of the Working Example 2

(c) cellulose resin with resin of crosslinked structure, it is something which introduces basis which provides photoacid-generating function for portion other than said crosslink site with acetal or ketal skeleton and it is a photosensitive resin composition which is made feature, photosensitive composition of Working Example 3

0038

本実施例・・・・・特・・(a)~(c)・1:1:1・混合・・用
 ・・・・・実施例 4・同様・
 ・上・・・・・形成・

0039

・・結果・0.20 μ m・
 ・・・・・形成・

0040

実施例 7

本実施例・・・・・実施例 6・(a)・(b)・1:1・混
 合・・用・

・・・・・同様・実施・・0.24 μ m・
 ・・・・・良好・・・・・形成・
 ・・・・・

0041

実施例 8

本実施例・・・・・実施例 6・(a)・(c)・1:1・混
 合・・用・

・・・・・同様・実施・・0.23 μ m・
 ・・・・・良好・・・・・形成・
 ・・・・・

0042

実施例 9

本実施例・・・・・実施例 6・(b)・(c)・1:1・混
 合・・用・

・・・・・同様・実施・・0.24 μ m・
 ・・・・・良好・・・・・形成・
 ・・・・・

0043

・発明・効果・

上述・如・・本発明・
 ・
 ・
 ・極超短波長光・発振波長領域・透
 明・感光性樹脂組成物・
 ・設計・
 ・例・
 ・感光材(光酸発生剤等)・
 ・導入・
 ・感光基・選択・
 ・長波長・感度
 (吸収)・
 ・構成・
 ・例・
 ・g 線,i
 線,KrF・
 ・使用可能・
 ・
 ・微細加工・好適・
 ・汎用性・富
 ・
 ・感光性樹脂組成物・提供・
 ・
 ・

[0038]

With this working example especially, (a) - 1: 1: mixing (c) at 1, it used, it formed pattern on silicon wafer this to similar to Working Example 4.

[0039]

As a result, satisfactory pattern of 0.20; μ m line and space is formed was possible.

[0040]

Working Example 7

With this working example, 1: mixing (a) and (b) of Working Example 6 to 1, it used.

Because of this, executing in same way, it forms satisfactory pattern of 0.24; μ m line and space it was possible.

[0041]

Working Example 8

With this working example, 1: mixing (a) and (c) of Working Example 6 to 1, it used.

Because of this, executing in same way, it forms satisfactory pattern of 0.23; μ m line and space it was possible.

[0042]

Working Example 9

With this working example, 1: mixing (b) and (c) of Working Example 6 to 1, it used.

Because of this, executing in same way, it forms satisfactory pattern of 0.24; μ m line and space it was possible.

[0043]

[Effects of the Invention]

As though it is a description above, according to this invention, as in the ArF excimer laser or other ultrashort wave Osamitsu excitation wavelength domain with transparent photosensitive resin composition, for example photosensitive material (photo acid generator etc) or with selection of photosensitive group which is introduced, from had sensitivity (Absorption) in long wavelength at same time with design, configuration doing, it is a usable even in for example g-line, i-line, KrF excimer laser etc, being ideal in microfabrication, and it was possible to offer photosensitive resin composition which it tries to be rich to commodity.